



DEPARTMENT OF COMMERCE

National Telecommunications and Information Administration

Developing a Report on Competition in the Mobile App Ecosystem

[Docket No. 220418-0099]

RIN 0660-XC052

AGENCY: National Telecommunications and Information Administration, U.S. Department of Commerce.

ACTION: Notice; request for comment.

SUMMARY: Restoring competition in the American technology sector is a critical priority of the President’s Executive order on Promoting Competition in the American Economy. On behalf of the U.S. Department of Commerce, the National Telecommunications and Information Administration (NTIA) is requesting comments on competition in the mobile application ecosystem. The data gathered through this process will be used to inform the Biden-Harris Administration’s competition agenda, including, but not limited to, the Department of Commerce’s work developing a report to submit to the Chair of the White House Competition Council regarding the mobile application ecosystem.

DATES: Written comments must be received on or before 11:59 p.m. Eastern Time on [insert date 30 days after date of publication in the *Federal Register*].

ADDRESSES: All electronic public comments on this action, identified by docket number NTIA-2022-0001 may be submitted through the Federal e-Rulemaking Portal at www.regulations.gov. The docket established for this rulemaking can be found at www.regulations.gov, NTIA-2022-0001. Click the “Comment Now!” icon, complete the required fields, and enter or attach your comments. Responders should include a page number on each page of their submissions. Please do not include in your comments information of a confidential nature, such as sensitive personal information or proprietary information. All

comments received are a part of the public record and will generally be posted to Regulations.gov without change. All personal identifying information (*e.g.*, name, address) voluntarily submitted by the commenter may be publicly accessible. For more detailed instructions about submitting comments, see the “Instructions for Commenters” section at the end of this Notice.

FOR FURTHER INFORMATION CONTACT: Please direct questions regarding this Notice to app-rfc@ntia.gov, indicating “Notice and Request for comment” in the subject line, or if by mail, addressed to Ruth Yodaiken, National Telecommunications and Information Administration, U.S. Department of Commerce, 1401 Constitution Avenue, NW, Room 4725, Washington, DC 20230; telephone: (202) 482-4067. Please direct media inquiries to NTIA’s Office of Public Affairs, telephone: (202) 482–7002; email: press@ntia.gov.

SUPPLEMENTARY INFORMATION:

I. BACKGROUND AND AUTHORITY

On July 9, 2021, the President signed Executive Order 14036 on Promoting Competition in the American Economy (EO).¹ As the EO explains, “[t]he American information technology sector has long been an engine of innovation and growth, but today a small number of dominant Internet platforms use their power to exclude market entrants, to extract monopoly profits, and to gather intimate personal information that they can exploit for their own advantage. Too many small businesses across the economy depend on those platforms and a few online marketplaces for their survival.”

The EO includes numerous initiatives to address the problem of dominant tech platforms undermining competition and reducing innovation. Included among them is a directive to the Secretary of Commerce to, in consultation with the Attorney General and the Chair of the Federal Trade Commission (FTC), conduct a study — including by conducting an open and

¹ EO 14036, 86 FR 36987, Section (r) (iii) (July 9, 2021), <https://www.govinfo.gov/content/pkg/FR-2021-07-14/pdf/2021-15069.pdf#page=1>.

transparent stakeholder consultation process — of the mobile application (app) ecosystem, and submit a report to the Chair of the White House Competition Council, regarding findings and recommendations for improving competition, reducing barriers to entry, and maximizing user benefit with respect to the ecosystem.²

By one account, the app economy was valued at \$1.7 trillion in 2020, and over 300,000 U.S. companies work in this sector, employing more than 5.9 million Americans.³ The two main app stores are operated by companies with headquarters in the United States. Global consumer spending in this ecosystem is also growing rapidly, estimated by some as nearly doubling from 2016 to 2020, to reach \$120 billion.⁴ Entire new sectors of industries have been spawned as a result of app innovation, such as ride sharing, or have experienced technical advancement, such as smart home appliances. The app economy is becoming a fundamental way that Americans interact with their environment. Thus, it is critical that this market be robust, open, innovative, and secure — and without barriers to entry and growth.

On behalf of the Department, and in furtherance of this requirement, NTIA is requesting comments from the public on competition in the ecosystem in which mobile apps exist. The goal is to support the Administration's efforts to promote competition in the tech sector and to inform NTIA's analysis of ways to support healthy competition in the market for mobile apps, in particular.

NTIA is the executive branch agency that is principally responsible by law for advising the President on telecommunications and information policy. NTIA studies and develops policy advice for the Administration related to communications and the Internet,⁵ including to promote

² Software applications are often referred to as “apps,” and the term is used throughout to refer to mobile apps, either native or web-based.

³ State of the U.S. App Economy: 2020. ACT: The App Association (Jan. 31, 2021) (ACT Report 2020), <https://actonline.org/wp-content/uploads/2020-App-economy-Report.pdf>.

⁴ ACT Report 2020.

⁵ See 47 U.S.C. 902 (b)(2)(D) and (H).

the efficient and effective use of telecommunications and information resources.⁶ In that role, NTIA regularly works on national policies on the communications infrastructure.⁷ Additionally, the Department more broadly is charged with promoting job creation and economic growth.

This study is aimed at examining unique aspects of competition involving apps on mobile phones and tablets.⁸ In doing so, we recognize that the general mobile ecosystem is comprised of a number of distinct types of entities and interrelated markets. Mobile service providers play a role in a range of relevant aspects, including broadband service and determining which apps are pre-loaded or set as defaults. At the same time, functionality and app distribution are also dependent upon operating systems and app stores, which function as sub-ecosystems.⁹ For this study, we are seeking to look beyond the general to examine particular environments in which different types of apps and associated businesses operate. For example, there might be different opportunities and barriers¹⁰ that distinguish some types of apps, such as those used for medical purposes, payments, streaming, social-networks, messaging, or apps that connect to other items

⁶ NTIA has also examined the economic aspects of modern technology. *See, e.g.*, Internet Policy Task Force & Digital Economy Leadership Team, Dep’t of Commerce, *Fostering the Advancement of the Internet of Things* (Jan. 2017), https://www.ntia.doc.gov/files/ntia/publications/iot_green_paper_01122017.pdf.

⁷ *See, e.g.*, NTIA ACCESS BROADBAND, 2021 Report (Dec. 2021), https://www.ntia.doc.gov/files/ntia/publications/ntia_access_broadband_2021_report.pdf.

⁸ This is similar to how the mobile ecosystem is described by United Kingdom’s Competition and Markets Authority (CMA) in its study of the “Mobile ecosystems.” *See* CMA, *Market Study Notice; Mobile Ecosystems*, para. 2, June 15, 2021 (UK) (“In this notice the supply of ‘mobile ecosystems’ means the supply of smartphones and tablets, and associated software such as operating systems, app stores, browsers, and applications”).

⁹ *See, e.g.*, Majority Staff of, H. Subcommittee on Antitrust, Commercial and Administrative Law, Comm. on the Judiciary, Rep. and Recommendations on Investigation of Competition in Digital Markets 2020 (House Subcommittee Digital Markets Report) (*e.g.*, descriptions of Google and Apple ecosystems, starting at 211 and 332, respectively), https://judiciary.house.gov/uploadedfiles/competition_in_digital_markets.pdf; *see also* CMA, *Mobile Ecosystems; Market Study Interim Report*, Dec. 14, 2021 (UK) (UK CMA Interim Report), <https://www.gov.uk/government/publications/mobile-ecosystems-market-study-interim-report>; Netherland Auth. for Consumers & Markets, *Market Study Into Mobile App Stores* (2019) (referring to bottlenecks at 40), <https://www.acm.nl/sites/default/files/documents/market-study-into-mobile-app-stores.pdf>.

¹⁰ Barriers that could make it harder to enter a field or succeed might include funding hurdles, restrictions by operating services or regulators, technical variations requiring additional software development and maintenance, or obstacles that prevent a business from obtaining a big enough user base to make their product workable (*e.g.*, a dating app).

by virtual or physical connections (*e.g.*, to tracking or Internet-of-Things devices). Other app ecosystems that exist or extend beyond mobile, such as those for gaming consoles and personal computers, might be relevant to our review, but only to the extent that analysis of them offers clear facts for comparison.

The Executive Order specifically requires consultation on the NTIA study with the Department of Justice (DOJ) and the FTC, who are the primary enforcers of competition law at the federal level. Law enforcement agencies have been assessing the evolving digital markets in which apps operate.¹¹ Along with actions by the states, private actors, the courts, and legislators, such legal examinations are shaping the mobile app ecosystem and have helped elevate the discussion of competition barriers, as well as proposals to facilitate greater competition in the app marketplace.¹² These actions have also been tangibly altering the ecosystem. For example, the roles of the two major app stores, including the commission fees they charge, and restrictions they place on how apps interact with consumers, as well as technical barriers, have been impacted by decisions by lawmakers across the globe.¹³

¹¹ See, *e.g.*, *United States et al. v. Google, LLC*, No. 1:20-cv-03010, (D.D.C. amended complaint filed Jan 15, 2021); “FTC Staff Presents Report on Nearly a Decade of Unreported Acquisitions by the Biggest Technology Companies,” FTC press release, Sept. 15, 2021 (study of acquisitions by Alphabet/Google, Amazon, Apple, Facebook, and Microsoft), <https://www.ftc.gov/news-events/press-releases/2021/09/ftc-report-on-unreported-acquisitions-by-biggest-tech-companies>; see also Substitute Amended Complaint for Injunctive and Other Equitable Relief at 44, *FTC v. Meta Platforms, Inc.*, No. 1:20-cv-03590 (D.D.C. Sept. 8, 2021).

¹² See, *e.g.*, Amended Complaint, *Utah v. Google LLC*, No. 3:21-cv-05227 (N.D. Cal Nov. 1, 2021) (37 AGs v. Google) (37 Attorneys General allege Google’s conduct has driven up competitor prices, limited consumer choice, misrepresented security risks of apps outside of its app store); see also Hearing of the Senate Subcommittee on Competition Policy, Antitrust, and Consumer Rights, Antitrust Applied: Examining Competition in App Stores (April 21, 2021), <https://www.judiciary.senate.gov/meetings/antitrust-applied-examining-competition-in-app-stores>; Digital platform services inquiry, Interim report No. 2 – App marketplaces, Australian Competition & Consumer Commission, March 2021.

¹³ See, *e.g.*, *South Korea: Amended Telecommunications Business Act Will Ban App Payment Monopolies*, Library of Congress, 2021, <https://www.loc.gov/item/global-legal-monitor/2021-09-16/south-korea-amended-telecommunications-business-act-will-ban-app-payment-monopolies/>; KCC Draws Up Standards to Determine Violation of Prohibited Acts By App Market Business Operators, Press Release, Korea Communications Commission (Mar. 10, 2022); *Epic Games, Inc. v. Apple, Inc.*, No. 4:20-cv-05640 (N.D. Cal. Sept. 10, 2021) (regarding Apple taking a percentage of apps’ revenues and limiting their communication with consumers); see also, Deal

Another area of inquiry has centered around the potential for abuse of commercial data obtained by competitors, to the detriment of privacy and competition.¹⁴ In addition, there are concerns about whether companies interfere with the creation of innovative new products and services by limiting the ability of mobile apps and their associated products and services from accessing a particular set or network of customers.¹⁵ While this study will not include a legal assessment of whether certain practices violate the law, we are interested in learning of rules and practices that make it harder to open and run businesses or that harm innovation.

In addition to competition agencies, other agencies have relevant roles in overseeing specific types of apps as part of a broader ecosystem. For example, the Federal Communications Commission (FCC) also oversees the communications marketplace, including aspects of competition between mobile service providers, and has for years assessed the competitive elements of the ecosystem.¹⁶ The Consumer Financial Protection Bureau (CFPB) has also been examining payment ecosystems.¹⁷

In the study, NTIA will take a holistic approach to analyzing the mobile app ecosystem with the goal of identifying recommendations to improve competition, reduce barriers to entry, and maximize user benefit with respect to the ecosystem. In addition to fundamentals about the

on Digital Markets Act: EU rules to ensure fair competition and more choice for users, Press Release, European Parliament, IMCO (Mar. 24, 2022) (noting the proposed legislation requires “that the largest messaging services (such as ... iMessage) will have to open up and interoperate with smaller messaging platforms, if they so request”), <https://www.europarl.europa.eu/news/en/press-room/20220315IPR25504/deal-on-digital-markets-act-ensuring-fair-competition-and-more-choice-for-users>.

¹⁴ See, e.g., Fact Sheet: Executive Order on Promoting Competition in the American Economy, The White House (July 9, 2021), <https://www.whitehouse.gov/briefing-room/statements-releases/2021/07/09/fact-sheet-executive-order-on-promoting-competition-in-the-american-economy/>; see also, House Subcommittee Digital Markets Report, *supra* note 6, at 43.

¹⁵ See, e.g., 37 AGs v. Google, *supra* note 9; see also, House Subcommittee Digital Markets Report, *supra* note 6, at 178.

¹⁶ See, e.g., FCC, 2020 Communications Marketplace Report, GN Doc. No. 20-60 (Dec. 31, 2020); FCC, Annual Report and Analysis of Competitive Market Conditions with Respect to Mobile Wireless, Including Commercial Mobile Services, DA-16-1061, WT Doc. No. 16-137, paras. 124-7 (Sept. 23, 2016) (19th Mobile Competition Report) (discussing mobile applications).

¹⁷ See, e.g., CFPB, Consumer Access to Financial Records, advance notice of proposed rulemaking, CFPB-2020-0034, 85 FR 71003 (Nov. 2020).

structure of the ecosystem, including how the apps are distributed, there are many issues that might be relevant to developers and app users. For example, common occurrences of fraud—or perceptions of it—might impact whether consumers download apps and businesses are comfortable offering their products through specific distribution channels. While there are many issue areas and markets that could be brought into this study, the scope will only address topics most relevant to the mobile app ecosystem.

Given the incredible promise that the app system holds, NTIA is also interested in learning what app users need to maximize user benefit,¹⁸ particularly users who use apps in their daily life or for business operations. There is limited information on how people use apps. For example, some sources estimate that each mobile device has 20-46 apps loaded at any time, but there is limited comparable data to confirm whether that is an accurate or optimal number to foster innovation.¹⁹

Topic areas that the agency will use to address mobile app ecosystem competition in the forthcoming report will be informed by input from public comment. Possible topics are outlined below.

II. REQUEST FOR COMMENT

Through this Request for Comment, NTIA is seeking public input to further develop its understanding of competition within the mobile app ecosystem. NTIA is looking for concrete and specific information as to what app developers, organizations, and device (i.e., phones; tablets) users experience, and any potential challenges or barriers that limit app distribution or user adoption. To the extent commenters choose to respond to the specific questions asked,

¹⁸ See, e.g., Jennifer Bjorhus, Minnesota teen wins Ann Bancroft grant for app to reduce litter, *StarTribune* (Dec. 24, 2021), <https://www.startribune.com/minnesota-teen-wins-ann-bancroft-grant-for-app-to-reduce-litter/600130173/?refresh=true>.

¹⁹ See, e.g., L. Ceci, Number of apps installed by mobile users in the United States as of 3rd quarter 2019, *Statista* (Oct. 19, 2021) (“Statista 2021”), <https://www.statista.com/statistics/267309/number-of-apps-on-mobile-phones>; Stephanie Chan, U.S. Consumers Used an Average of 46 Apps Each Month in the First Half of 2021, *Sensor Tower* (Aug. 19, 2021), <https://sensortower.com/blog/apps-used-per-us-smartphone>.

responses should generally follow the structure below and note the number corresponding to the question. As detailed below, through this Request for Comment, NTIA is seeking information on the state of competition, the factors affecting app development and distribution, and active ways to increase competition, through government or private sector action.

Definitions and Statistics

1. How should we measure whether the app ecosystem is competitive?
 - a. How should the “success” of an app be measured?²⁰
 - b. How should the “failure” of an app be measured?²¹ What is known about the reasons that app developers no longer offer or support apps?
 - c. Does the reported total of the number of apps available at any one time in an app store have bearing on the state of competition among apps or particular categories of apps?²²
2. Are there any important and specific entities (or categories of entities) such that it would be a mistake to omit – or improperly include – them by defining the “mobile app ecosystem” to focus on mobile devices, such as phones and tablets?
 - a. If so, how should this study be scoped so that it is optimal but feasible?
 - b. For example, should mobile apps offered specifically for enterprise use (e.g., for use by businesses, not for consumers) be considered in this study?
3. Apps are not all the same. For example, some have different technical features and capabilities (e.g., location-based apps compared to messaging apps), while others are bound by specific regulatory guardrails (e.g., banking apps or children’s apps). In the

²⁰ See, e.g., Using Pirate Metrics to Analyze Your Mobile Application’s Audience, Jacob Parcell, General Services Administration (May 12, 2016), <https://digital.gov/2016/05/12/using-pirate-metrics-to-analyze-your-mobile-applications-audience/>.

²¹ See, e.g., Why Consumers Download, and Delete, a Retailer’s Mobile App: Promos and rewards drive downloads, eMarketer (July 14, 2016), <https://www.emarketer.com/Article/Why-Consumers-Download-Delete-Retailers-Mobile-App/1014212>.

²² See, e.g., L. Ceci, Number of apps available in leading app stores as of 2021, Statista (Dec 14, 2021), <https://www.statista.com/statistics/276623/number-of-apps-available-in-leading-app-stores/>.

- context of framing competitiveness within the ecosystem, how should we categorize types of apps so that they are grouped by distinguishable barriers and other significant factors? Are there ways to best categorize or segment the market to diagnose specific market barriers, such as those that could impact app developers, or consumers?
- a. Should distinctions be made based on type of content and app functionality?
 - b. Should distinctions be made based on the level of hardware or operating system integration required for the app to function? For example, categories might include apps that access location data, special-purpose hardware (e.g., near field communications), secure elements for payment, or other credentials.
 - c. Should a distinction be made for apps that are the primary way (or the only way) the app provider interacts with users, as opposed to apps that are an extension of an existing digital or physical business? Do app-based businesses face different competitive constraints than businesses that have a brand and presence outside of mobile apps?
4. How should web apps (browser-based) or other apps that operate on a mobile middleware layer be categorized?
 5. There are some indicators that there is a difference in kind between some apps that generate large amounts of money or are downloaded often and most other apps. For example, one industry analyst reported that 97% of publishers that monetize through the Apple App Store earned less than \$1 million per annum in 2021, compared to other reports of more than \$1 billion earned by the top 13 apps (including games) on both Apple and Google platforms.²³ What is the best way to assess the competition environment for less popular apps and start-ups?

²³ State of Mobile 2021, App Annie, at 8, (last visited April 14, 2022), <https://www.data.ai/en/go/state-of-mobile-2021/>; *see also* App Annie: Global app stores' consumer spend up 19% to \$170B in 2021, downloads grew 5% to 230B, Sarah Perez, TechCrunch, Jan. 12, 2022, <https://techcrunch.com/2022/01/12/app-annie-global-app-stores->

- a. Can any potential harms, such as deficiencies in data security and privacy protections, be traced back to the current market imbalance?
- b. Is there evidence to suggest that consumers are less likely to avoid or stop using a particular app even if they would prefer a more privacy enhancing environment because of a lack of competitors offering similar services?

Software and Support for Developers

6. What unique factors, including advantages and obstacles, are there generally for app development — especially start-ups — that are relevant for competition?²⁴
 - a. Are there unique market dynamics in this ecosystem (such as the existence of a small number of dominant technology companies) that affect mobile apps' ability to secure funding?²⁵
 - b. Are some methods of monetization essential to the economic success of an app? What are they? For example, is there pressure to incorporate advertising or collect personal data of users²⁶ or engage in unique relationships with data aggregators?

consumer-spend-up-19-to-170b-in-2021-downloads-grew-5-to-230b/?utm_medium=TCnewsletter&tpcc=TCappnewsletter.

²⁴ See, e.g., Letter from Congresswoman Eshoo and colleagues to Director Panchanathan, National Science Foundation, and Acting Director Jarmin, Census Bureau, Nov. 4, 2021, <https://eshoo.house.gov/sites/eshoo.house.gov/files/AnnualBusinessSurveyLetter11421.pdf>.

²⁵ See, e.g., Written Testimony of FTC Commissioner Rohit Chopra before the U.S. House of Representatives, Committee on the Judiciary, Subcommittee on Antitrust, Commercial, and Administrative Law Hearing on Online Platforms and Market Power, Part 3: The Role of Data and Privacy in Competition, (Oct. 18, 2019) (expressing concern “that many investors are reluctant to allocate capital to innovators that seek to challenge and disrupt this dominance. Instead, investors tell me they prefer to fund companies that can eventually be sold an incumbent”), https://www.ftc.gov/system/files/documents/public_statements/1549812/chopra_-_testimony_at_hearing_on_online_platforms_and_market_power_part_3_10-18-19.pdf; see, e.g., Free and paid distribution for Android and iOS 2022, Statista, March 14, 2022, (last visited April 14, 2022) (Most apps are offered at no direct monetary cost to the user), <https://www.statista.com/statistics/263797/number-of-applications-for-mobile-phones/#:~:text=As%20of%20March%202021%2C%2096.7%20percent%20of%20apps,Store%20and%20Google%20Play%20as%20of%20March%202021.>

7. Are there particular obstacles preventing more development from different communities, such as by location/region, ethnicity/race, language, or gender?²⁷
8. Are there studies or specific examples of the costs or advantages for app developers to build apps for either, or both, of the main operating systems, iOS and Android (which have different requirements)?²⁸
 - a. What are the challenges specific to multi-platform development and how can they be mitigated?
 - b. What are the costs and advantages of developing standalone apps for these platforms relative to other means of providing the same services or content, such as web apps, which can operate across platforms?
9. What role does interoperability play in supporting and advancing a competitive mobile app ecosystem?
 - a. What are the key characteristics of interoperability as it relates to the mobile app ecosystem?
 - b. What other barriers (e.g., legal, technical, market, pricing of interface access such as Application Programming Interfaces [APIs]) exist, if any, in fostering effective interoperability in this ecosystem? How are these barriers different or similar than those present in other ecosystems?
 - c. How does data portability, or lack thereof, factor into consumers keeping the same app if they switch from one operating system (iOS or Android) to another?²⁹

²⁷ See, e.g., Congressional App Challenge, Inclusion and Diversity, <https://www.congressionalappchallenge.us/impact/#Diversity>; see, generally, Congressional App Challenge (last visited April 18, 2022), <https://www.congressionalappchallenge.us/>.

²⁸ See, e.g., App Development Costs, Business of Apps (2022) (April 1, 2022), <https://www.businessofapps.com/app-developers/research/app-development-cost/>; contrast Sophie Zoria, How the Fragmentation of iOS and Android Platforms Affects App Development, Medium, Swag Soft, June 23, 2020, <https://medium.com/swag-soft/how-the-fragmentation-of-ios-and-android-platforms-affects-app-development-f992cb87bafc>.

²⁹ For descriptions of some difficulties reported in this area, see Majority Staff of, H. Subcommittee on Antitrust, Commercial and Administrative Law, Comm. on the Judiciary, Rep. and Recommendations on Investigation of Competition in Digital Markets, at 102-104 (2020).

10. While apps can be coded from scratch, Software Development Kits (SDKs) and other technical tools can make it easier for developers to create apps. What data is available to show how such tools shape the ecosystem and affect the ability of developers to compete?
- Which tools are most often used by app developers and what are the entities that offer those tools?
 - Do these tools make it easier for a developer to create apps for multiple platforms? How so? Are there any trade-offs (*e.g.*, performance, battery life, or stability) for using these tools?
 - Are developers of certain types of apps more likely to use the assistance?
 - Are there privacy or security concerns associated specifically with these tools?
 - What empirical data exists to support findings on this topic?
11. How do policy decisions by firms that operate app stores, build operating systems, or design hardware impact app developers (*e.g.*, terms of service for app developers)? What empirical data exists to support those findings?
- In particular, how does a lack of transparency about app market rejections affect app developers (*e.g.*, costs)?
 - How do the policy decisions affect or limit the feasibility or availability of alternative models of app development (*e.g.* open source), delivery (*e.g.* browser-based apps), or funding (*e.g.* non-commercial or donation-based models)?
12. What types of labor restrictions or workforce pipeline challenges, if any, limit paths for app innovation? What may solutions look like?

Avenues for App Distribution

13. Some mobile apps are pre-loaded on mobile devices or set as default apps, while others are only available through an app store, through a browser (web apps), or, for

- devices using the Android system, by sideloading. Is there data comparing these mechanisms and their effect on app distribution?
- a. Is there a competitive advantage to being preloaded or available by default to the users of phones and tablets? What is the evidence to support or contradict there being an advantage?³⁰
 - b. Is there data on the number of developers that have been able to have their apps preloaded or available as default apps or the types of apps?
 - c. What information is available on the types of agreements these developers reached and with whom to preload or set their app as a default app?
14. As noted above, governments and courts are already exploring concerns about control of app access to users exercised by mobile app stores and other ecosystem participants.
- a. What data and studies exist that identify specific additional obstacles that developers and businesses might face related to the distribution of apps?³¹
Commenters may reference factual findings in existing cases and filings in government explorations.³²
 - b. In particular, what studies have been done on requirements that apps use an app store or operating system's own services or the appeal of alternative mechanisms that do not tie app access to using other products or services from those mechanisms?
15. How do, or might, alternative app stores (other than Google Play or the Apple App Store), affect competition in the mobile app ecosystem?

³⁰ While the UK CMA's Interim Report, for example, refers to some studies in this area, the raw data and it suggests further study is necessary. *See, e.g.*, UK CMA Interim Report at 277.

³¹ *See, e.g.*, Letter to Kate Reader and Morag Bond, Co-General Managers, Digital Platforms Unit, Australian Competition and Consumer Comm'n, from Microsoft, Oct. 16, 2020, <https://www.accc.gov.au/system/files/Microsoft%20%2816%20October%29.pdf>.

³² *See, e.g.*, Report regarding Fact-Finding Survey on Digital Platforms (Business-to-Business transactions on retail platform and app store), Fair Trade Commiss'n, (Oct. 31, 2019) (Japan).

- a. What data is there to assess how well existing alternative stores distribute apps, in general or specific types of apps?
 - b. What unique barriers are there affecting each of the main operating systems (Android, iOS) that might prevent web apps or — to the extent allowed on Android system — alternative app stores and sideloading, from gaining more popularity with users and app developers than they currently have?
 - c. Is there analysis comparing competition on iOS ecosystem (where app distribution is limited) to that of alternative distribution mechanisms on Android operating systems?
16. What evidence is there to assess whether an app store model is necessary for mobile devices, instead of the general-purpose model used for desktop computing applications?
17. Mobile app stores act as initial screeners and responders for concerns about mobile app content, such as fraudulent apps and malware.³³ Similar issues for screening and responding exist in other contexts, such as website hosting and search engine retrieval. What empirical data is there analyzing any unique content screening issues related to mobile app stores that affect competition?
- a. Is there evidence of legitimate apps being rejected from app stores or otherwise blocked from mobile devices? Is there evidence that this is a common occurrence or happens to significant numbers of apps?

³³ See, e.g., App Store stopped over \$1.5 billion in suspect transactions in 2020, Apple, <https://www.apple.com/newsroom/2021/05/app-store-stopped-over-1-5-billion-in-suspect-transactions-in-2020/>; see also Google Developer Policy Center (with policies prohibiting items such as impersonation of other apps) (last visited April 14, 2022), <https://play.google.com/about/developer-content-policy/>.

- b. What assessments are there of their effectiveness, or lack therefore, on security and privacy of end users?³⁴
 - c. Are there disincentives or unique barriers affecting the degree of security and privacy protections offered by alternative app stores?
18. Are there other areas, specific technologies or procedures, that offer lessons on more and less successful ways to screen out problematic apps? What are the characteristics of such success?
- a. Are there good examples by enterprise users?³⁵
 - b. For example, some devices allow sideloading only after warning the user to make sure they trust the app before proceeding with the download, in a way similar to how some browsers issue warnings for unknown websites. What material exists about the efficacy of such methods?
 - c. What roles, if any, do independent or third party security testing play in the app store ecosystem?
 - d. Does the current model discourage competition and innovation in the development or advancement of security testing?
19. How does the existence of imposter and other fraudulent apps affect developer incentives or legitimate app lifecycles?

App Users

20. What research exists regarding the number of active apps consumers have on their mobile devices at any one time and how often they try new ones?

³⁴ See, e.g., Complaint, In the Matter of Support King LLC (SpyFone.com), FTC, No. 1923003 (filed Dec. 21, 2021) (complaint filed with settlement decision and order), https://www.ftc.gov/system/files/documents/cases/1923003c4756spyfonecomplaint_0.pdf.

³⁵ For more on mobile vetting and security issues, see, e.g., Vetting the Security of Mobile Applications, Revision 1, NIST Special Publication 800-163, National Institute of Science and Technology (NIST) (April 2019), <https://nvlpubs.nist.gov/nistpubs/SpecialPublications/NIST.SP.800-163r1.pdf>; see also Mobile Device Security: Corporate-Owned Personally-Enabled (COPE), NIST Special Publication 1800-21 (Sept. 2020), <https://doi.org/10.6028/NIST.SP.1800-21>.

- a. Are there generalizations that can be made based on items such as the cost of the app, type of broadband access or device, or even categories of phone users?
21. How do most consumers find and make decisions to use apps?
- a. Is there data to show whether the usage of an app or any other relevant metric for performance is tied to existing brand visibility outside of the mobile app ecosystem?
 - b. Is there data about how often people use the search feature in an app store, search engines through browsers, or particular ranking lists of popular apps or app storefronts?
 - c. Is there empirical data that examines how app rankings, app reviews, or other objective measures of apps (for example, popularity, quality, or number of downloads) are used (or manipulated) to influence consumer choices?
22. The EO asks the Department to explore ways to maximize “user benefit” with regard to competition in the mobile app ecosystem. How should we measure or consider user benefit?
- a. What is the appropriate scope of users for consideration? Should it include developers?
 - b. If there are conflicts between end-user and developer interests, how does this affect the assessment of user benefit?
 - c. How might convergence of end-users and developers – through low-code environments, for example – affect this dynamic moving forward?
23. Do apps that are developed for, or used by, certain communities (such as by income, ethnicity/race, or gender) face significantly different competitive challenges? What are the challenges?

Other Factors

24. Some apps make use, or would like to make use, of additional mobile device components beyond those that are more commonly accessible (e.g., camera, microphone, contacts) in order to offer an innovative product or service, but the operating system or device provider does not allow such access.³⁶ Similarly, for some apps, it might be essential to be able to interconnect to other hardware and services, such as cloud services. What are the valid security concerns and technical limitations on what device functionality an app can access?
- a. What factors should be considered in striking a balance between encouraging companies to ensure proper security measures, while allowing third parties to access the protected features that might allow for further innovation and competition?
 - b. Are there specific unnecessary (e.g., technical) constraints placed on this ability of app developers to make use of device capabilities, whether by device-makers, service providers or operating system providers, that impact competition?
 - c. Are there other means or factors to consider for mitigating specific risks that would not inhibit competition?
25. What unique challenges, if any, do software updates pose for app competition, including updates driven by the app developers and those necessitated by other ecosystem changes, such as operating system updates? How does this impact security and costs for those apps, products, and services?
26. Are there governance practices, regulations or laws that impact competition among certain categories of apps more than others, or their non-app counterparts?

Potential Actions to Increase Competition

³⁶ See, e.g., Testimony of Testimony of Kirsten Daru, Chief Privacy Officer and General Counsel for Tile, Inc., before the Senate Committee on the Judiciary Subcommittee on Competition Policy, Antitrust, and Consumer Rights (April 2021), <https://www.judiciary.senate.gov/imo/media/doc/04.21.21%20Kirsten%20Daru%20Senate%20Judiciary%20Testimony%20Final.pdf>.

27. What specific measures might the federal government take to foster healthy competition – especially for nascent app innovation – in the mobile app ecosystem?
28. What specific actions could the private sector and civil society take to ensure and promote healthy app competition (such as technical standards development or monitoring)?³⁷

Instructions for Commenters

NTIA invites comment on the full range of issues presented by this Notice, including issues that are not specifically raised in the above questions. Commenters are encouraged to address any or all of the questions above. To the extent commenters choose to respond to the specific questions asked, responses should generally follow the structure above and note the number corresponding to the question.

Comments that contain references to studies, research, and other empirical data that are not widely available should include copies of the referenced materials along with the submitted comments. Commenters should include the name of the person or organization filing the comment, which will facilitate agency follow up for clarifications as necessary.

Commenters are advised not to incorporate information that concerns business trade secrets or other confidential commercial or financial information as part of the comment.³⁸

Dated: April 18, 2022.

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³⁷ See, e.g., Adapting ahead of regulation: a principled approach to app stores, Brad Smith, President & Vice Chair, Microsoft, Feb 9, 2022, <https://blogs.microsoft.com/on-the-issues/2022/02/09/open-app-store-principles-activision-blizzard/>.

³⁸ See also 15 CFR 4.9(c) (concerning the designation of business information by commenters).